

Brian Schweitzer, Governor

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March 14, 2011

Ms Rebecca Thomas US EPA, Region 8 1595 Wynkoop St Denver CO 80202-1129

Re: Draft Focused Feasibility Study Report, Operable Unit 5, Libby Asbestos

National Priorities List Site, Libby, Montana (January 2011)

Dear Ms Thomas:

The Montana Department of Environmental Quality (DEQ) appreciates the opportunity to comment on the Draft Focused Feasibility Study Report (FFS) for Operable Unit 5 (OU5) of the Libby Asbestos Site. Please find our text-specific comments in the attached red-line/strikeout version of the Word document attached.

DEQ generally supports the Focused Feasibility Study for OU5 at this time. However, the need to re-evaluate the remedial decision once a site-wide risk assessment has been completed should be noted in the FFS but must be indicated in the Record of Decision. At OU5, there will be residual contamination remaining both in surface soils and inside buildings. Since the pathways will not be eliminated in either of the remaining alternatives, the protectiveness of the remedial action must be re-evaluated and additional actions may be necessary.

We look forward to our continued cooperative approach at the Libby Asbestos Site. Please feel free to contact me at (406) 841-504 or clecours@mt.gov with any questions or concerns.

Sincerely,

Catherine LeCours

Cother Delo-

Federal Superfund Project Manager Montana Department of Environmental Quality

cc: Remediation Files Kirsten Bowers

# **DRAFT**

# **Focused Feasibility Study**

Operable Unit 5

Libby Asbestos National Priorities List Site

Libby, MT

December 2010

Prepared for US Environmental Protection Agency

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**Comment [LC1]:** Why on 8.3 is the "r" small case? It's not that way in the text.

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# LIST OF ACRONYMS

ABS	activity-based sampling		
ARA	Rs applicable or relevant and appropriate requirements		
ARN	Administrative Rules of Montana		
bgs	below ground surface		
CER	CLA Comprehensive Environmental Response, Compensation, and Liability Act		
CFR	Code of Federal Regulations		
CSM	conceptual site model		
CTE	central tendency exposure		
EPA	U. S. Environmental Protection Agency		
ERS	Environmental Resource Specialist		Deleted: Emergency
FFS	Focused Feasibility Study		
ft	feet		
Grac	W.R. Grace Company		
HQ	hazard quotient		
KBF	D Kootenai Business Park Industrial District		
LA	Libby amphibole		
MD1	Q Montana Department of Environmental Quality		
MC	Montana Code Annotated		
MD'	Montana Department of Transportation		
NCF	National Oil and Hazardous Substances Pollution Contingency Plan		
ND	non-detect		
NES	HAP National Emissions Standards for Hazardous Air Pollutants		
NHI	A National Historical Preservation Act		
NPL	National Priorities List		
O&1			
OU	operable unit		
PCM	phase contrast microscopy		Deleted: P
PLN	polarized light microscopy		Deleted: C
RAC	remedial action objective	``	Deleted: M
RfC	reference concentration		
RI	remedial investigation		
RMI	reasonable maximum exposure		
ROI	Record of Decision		
SLE			Comment [LC2]: This word "site" is not used
TEM	1 3	",	this way in the document. I would recommend NOT using it to represent OU5 as it represents the Libby
USC	<u> </u>	17	Asbestos Superfund Site as it is used quite often in
XRI	X-ray diffraction	'\'	the text.
bgs	below ground surface		Comment [LC3]: Not used in document
S/cc	structures per cubic centimeter	, ``,	Deleted: Site Operable Unit No.5 site¶
s/cm	structures per square centimeter		Comment [LC4]: Not used in document
I			Comment [LC5]: Not used in document
			Deleted: S

### **EXECUTIVE SUMMARY**

#### Overview

This Focused Feasibility Study (FFS) assesses the effectiveness of past Response Actions at Operable Unit No.5 (OU5) of the Libby Asbestos National Priorities List Site (the NPL Site) and identifies and evaluates remedial alternatives to be documented under a Record of Decision (ROD). The purpose of remedial alternatives is to cost-effectively mitigate risks associated with various site media containing Libby amphibole (LA) asbestos including: soil, dust, indoor and outdoor air, and bulk materials.

Operable Unit 5 is also referred to as the former Stimson Lumber Mill site, as many lumber processing facilities were located throughout OU5. The majority of lumber production activities ceased in 2003 when Stimson Lumber Company sold the property to Lincoln County Port Authority and ownership was subsequently transferred to the current owner, Kootenai Business Park Industrial District (KBPID). The OU5 site is currently being redeveloped for a variety of uses, both recreational and industrial. Major site features and land uses are illustrated on Figure ES-1.

The RI reached the following general conclusions:

- 1. Polarized Light Microscopy (PLM) results for LA in surface soil samples are generally non-detect or trace across OU5. One area where PLM results have consistently been higher (with observed LA concentration levels up to 1%) includes portions of the former Tree Nursery area. This location also has elevated visible vermiculite scores.
- 2. PLM results for LA and visible vermiculite in subsurface soil samples are generally non-detect. These results suggest that in areas examined, the occurrence of LA or vermiculite does not increase with depth. However, subsurface soil sampling across OU5 was limited to areas where buried vermiculite was suspected based on historical land use.
- 3. Predicting LA levels in air associated with disturbance activities based only on measured LA levels in source material is extremely difficult. Therefore, the most direct way to determine potential exposures from inhalation is to measure, through sample and analysis, the concentration of LA in air during a specific activity that disturbs a source material. For convenience, this is referred to as activity-based sampling (ABS).
- 4. Exposure pathways that are thought to be most likely of potential concern in OU5 include:
  - Exposure of indoor workers to LA in indoor air of existing buildings.
  - Exposure of outdoor workers to LA in soil.
  - Exposure of motorcycle riders and spectators to LA in soil at the Moto-X Park.

• Exposure of bicycle riders to I	A in soil along the recreational trail.	
DRAFT Focused Feasibility Study Operable Unit 5, Libby Asbestos NPL Site	ES-2	

- 5. ABS air sampling was conducted in all existing buildings (as of June 2010) except the Finger Joiner Processing Plant. Excess cancer risk estimates are within or below EPA's acceptable risk range of 1E-4 to 1E-6 for all sampled buildings, indicating that indoor worker exposures at these buildings are likely to be of relatively low concern.
- 6. Cancer risk estimates for workers exposed to outdoor air during soil disturbance activities in each ABS area are within or below EPA's acceptable risk range (1E-4 to 1E-6). Therefore, outdoor worker exposures to LA from disturbing soil in these ABS areas are likely to be of relatively low concern.
- 7. Estimated cancer risks for both riders and spectators at the Moto-X Park are within or below EPA's acceptable risk range. These results support the conclusion that inhalation of outdoor air at the Moto-X Park is unlikely to be a source of significant excess cancer risk to either Moto-X riders or spectators.
- 8. Estimated cancer risk estimates for both adults and children exposed to outdoor air while biking along the recreational path are below EPA's acceptable risk range. These results support the conclusion that inhalation of outdoor air along the recreational path is unlikely to be a source of significant excess cancer risk.
- 9. Estimated cancer risks for workers exposed to outdoor air during waste bark pile disturbance activities are within EPA's acceptable risk range. These results support the conclusion that inhalation of outdoor air near disturbances of the waste bark piles is unlikely to be a source of significant excess cancer risk to outdoor workers.
- 10. At present, EPA is working to derive a Reference Concentration (RfC) for inhalation exposure to LA, but this value is still under development and is not yet available for use in estimation of Hazard Quotient (HQ) values. Therefore, no quantitative evaluation of non-cancer risk is included in the risk assessment.
- 11. An ecological risk assessment is being developed for the mine site (OU3). EPA will build upon information gathered during the ecological risk assessment to identify potential pathways and receptors to evaluate ecological risk at OU5.

Based on the Site Characterization, the media and contaminant of concern at OU5 include:

- LA in surface and subsurface soils
- LA in wood chips
- LA in dust on interior surfaces of existing buildings

**Comment [BK6]:** Explain why no ABS sampling was conducted in the Finger Joiner Processing Plant.

**Comment [BK7]:** Explain that risk estimates are based on the toxicity factors for chrysotile and not amphibole.

Disturbance of these contaminated media transfer LA fibers into the air where human exposure may occur via inhalation. Therefore, the following migration pathways are of concern at OU5:

- LA released into the air from soil or wood chip disturbance activities
- LA released into the air after disturbance of dust on interior surfaces

Based on the foregoing, the single Remedial Action Objective for OU5 is to prevent unacceptable human exposure to LA fibers.

Given that cancer risk estimates are within EPA's acceptable range for current land use, remedial alternatives that involve actions to further lower cancer risk are developed for comparison with alternatives that seek to maintain the current level of protectiveness. Remedial alternatives that seek to further lower cancer risk may not be necessary to achieve an acceptable level of protectiveness of human health at OU5.

The FFS developed four remedial alternatives including the No Further Action Alternative. One alternative relies solely on institutional controls (ICs) to maintain the current level of protectiveness. The two remaining alternatives would reduce risks from LA through the installation of a soil cover or through decontamination of existing structures. Because all areas of OU5 surface soils are inferred to present an estimated cancer risk below a level of concern, the soil cover alternative that seeks to further reduce cancer risks at OU5 would be implemented across the entire OU rather than subareas. Decontamination of existing buildings would be limited to those with estimated cancer risks above 1E-6 (total of 17).

During screening of alternatives, those that seek to further lower cancer risks (soil cover and existing building decontamination) were dropped from further consideration due to excessive costs compared to effective risk reduction.

Because retained alternatives do not involve disturbance of structures or terrain, no location- or action-specific Applicable, Relevant or Appropriate Requirements (ARARs) exist. However, one chemical-specific ARAR was identified:

• Occupational Exposure – Occupation Safety and Health Administration (OSHA) Permissible Exposure Limits (PELs).

The retained alternatives subjected to the detailed and comparative analyses included:

### Alternative 1 -No Further Action

The No Further Action Alternative leaves OU5 in its current condition. However, certain Sitewide programs established to address proposed excavations or discovery of vermiculite will remain in force at OU5 as well as the rest of the Site.

Comment [BK8]: No Further Action is more appropriate since some removal actions have occurred at OU-5.

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Comment [BK9]: The ICs are intended to control/condition future redevelopment of the site. In the event future redevelopment occurs, it would be in compliance with ARARs including the ARARs listed for OU-1.

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Current programs of this nature include:

- U-Dig A program by which EPA would be notified if a request for utility location services are made.
- ERS Hotline Beginning in October 2006, EPA implemented the Environmental Resource Specialist (ERS) program for the entire Site, including OU5. This program was set up to assist with unplanned and urgent exposures to vermiculite attic insulation and LA. The ERS program provides a full-time service where property owners, firemen, and other affected personnel or citizens can obtain access to LA expertise outside the normal course of scheduled clean-up actions. The ERS program currently responds to reports of residual vermiculite in OU5 buildings.

#### Alternative 2 – Institutional Controls

Under this alternative, ICs would be implemented to minimize the likelihood of any change in the current level of protectiveness at OU5. Controls such as restrictive covenants, zoning ordinances, easements, deed <u>notices and/or</u> restrictions, and public information serve to <u>manage</u> land uses to acceptable activities or guide behavior to avoid exposures that may exceed health-based levels. Additionally, ICs <u>will provide recorded notice upon</u> transfer of ownership so that land restrictions are clear when ownership changes.

Institutional controls under this alternative would be specific to OU5 in addition to Site wide programs discussed under Alternative No. 1. It is possible that future Site-wide programs similar to ERS will be developed and implemented.

The OU-specific ICs would likely include management of

- Changes in land use.
- Earthwork.
- Changes in building occupancy.
- Building modifications.
- <u>Contaminated</u> materials removed from OU5.

Division of responsibilities for implementation of ICs would be defined in a work plan prepared under the remedial design phase should Alternative 2 be selected. Lincoln County does not currently regulate land zoning/uses nor does it issue building permits. Therefore, the County currently does not have a mechanism in-place for implementing ICs. Oversight of IC implementation, monitoring, and enforcement may include EPA, State of Montana and the City and County Health Board.

Operation and maintenance (O&M) would include periodic reviews (by EPA) of IC compliance and reporting as well as responding to notifications of proposed changes in land use, building

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**Comment [LC10]:** I like using management instead of restrictions. Not all IC's restrict these actions, just manage them to ensure protection.

**Deleted:** restrictions

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Comment [LC11]: I think it's too early to say this. There are ways for the County to create mechanisms if necessary – through the Board of Health.

**Deleted:** The most likely mechanism for implementation would be a deed restriction

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Comment [LC12]: This is not how EPA defines O&M for Superfund (although if EPA wants all O&M, fine by us!) – and I'm not sure that EPA is the ne who should or even can do some of these things. EPA, in consultation with DEQ, does perform the 5 year reviews. However, I think we've all seen where IC monitoring and implementation should be more frequently than 5 years.

modifications or changes in building occupancy.	In addition,	statutory Five-Year reviews would
be required.		

A summary of the comparative analysis of retained alternatives is presented in Table ES-1.

**Comment [LC13]:** Statutory review every 5 years if wastes above health-based levels remain at the site.

So if 5 yr review are not mentioned for Alt 1, are you saying nothing is left that we have to worry about? Then why IC's??

Table ES-1 Comparative Analysis of Alternatives

Evaluation Criteria	Alternative No. 1 - No Action	Alternative No. 2 - Institutional Controls
Overall Protection of Human Health and the Environment	Current conditions are protective of human health. However, no provisions to maintain protectiveness in the event of changes in land use, building occupancy or off-site transport of site contamination.	Includes provisions to minimize the likelihood that risks to human health will rise above a level of concern in the future should there be changes in land use, building occupancy or the need for off-site disposal of site contamination.
Compliance with ARARs	Complies with ARARs.	Complies with ARARs.
Long-Term Effectiveness	It is possible that protectiveness would not be maintained in the long-term as a result of uncontrolled changes in land use and other site conditions.	Institutional controls would have to be maintained in near-perpetuity but such ICs would minimize the likelihood of unacceptable risks to humans.
Reduction of Toxicity, Mobility or Volume through Treatment	Provides no treatment; therefore, does not provide for reduction of toxicity, mobility, or volume of contaminants through treatment.	Provides no treatment; therefore, does not provide for reduction of toxicity, mobility, or volume of contaminants through treatment.
Short Term Effectiveness	Involves no remedial action.	No disturbance of structures or terrain.
Implementability		
Technical Feasibility	No action required.	Easily <u>Implementable</u> .
Administrative Feasibility	No action required.	Easily Implementable.
Availability of Services and Materials	No action required.	Services and materials are readily available.
Anticipated State Acceptance	Assessed during the FFS comment period.	Assessed during the FFS comment period.
Anticipated Community Acceptance	Assessed during the FFS comment period.	Assessed during the FFS comment period.
Cost*		
Capital Costs	\$0	\$56,000
Present Worth Post-Construction Operation and Maintenance Costs	\$0	\$180,000
Grand Total	\$0	\$236,000

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Comment [LC14]: I read this as going against what was said earlier about the County not having any mechanisms. Not to say they can't get those mechanisms, but here you say they are readily available – maybe say "not everything needed is currently in place but are possible to put in place" – or something along those lines.

Comment [LC15]: What does the asterisk mean?

### 1. INTRODUCTION

#### 1.1. OVERVIEW AND REPORT ORGANIZATION

This Focused Feasibility Study (FFS) assesses the effectiveness of past Response Actions at Operable Unit No. 5 (OU5) of the Libby Asbestos National Priorities List Site (the NPL Site) and identifies and evaluates remedial alternatives to be documented under a Record of Decision (ROD). The purpose of remedial alternatives is to mitigate risks associated with various site media containing Libby amphibole (LA) asbestos including: soil, dust, indoor and outdoor air, and bulk materials.

The FFS follows the general Feasibility Study process. However, the step that involves screening of potentially applicable remedial technologies is omitted. Rather, the process begins with a list of fully assembled remedial alternatives that are screened against several criteria including effectiveness, implementability and cost. Retained alternatives are then advanced to the detailed and comparative analysis steps.

The FFS report includes the following major sections:

Section 1.0 – Introduction – This section describes the purpose of the FFS, summarizes NPL Site history, and provides an overview of the FFS process.

Section 2.0 – Site Characterization – This section describes the physical setting and nature and extent of contamination.

Section 3.0 – Remedial Action Objectives – This section discusses remedial action objectives for OUS

Section 4.0 – Previous Response Actions – This section summarizes response actions at OU5.

Section 5.0 – ARARs – This section discusses potentially Applicable or Relevant and Appropriate Requirements (ARARs) for remedial alternatives.

Section 6.0 – Development and Screening of Remedial Alternatives – This section screens candidate remedial alternatives for effectiveness, implementability, and cost. Alternatives may be eliminated at this stage.

Section 7.0 – Detailed Analysis of Alternatives – This section evaluates retained alternatives against nine criteria specified in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

Section 8.0 – Comparative Analysis of Alternatives – This section compares and contrasts retained alternatives using nine NCP criteria as the measure.

**Comment [LC16]:** The NCP does not include "cost-effectiveness" as a criterion, just cost for screening.

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Section 9.0 References – This section provides full references for all citations in the body of the report.

### 1.2. NPL SITE LOCATION & TOPOGRAPHY

The City of Libby, Montana has a total area of 1.3 square miles and is located in the northwest corner of the state, 35 miles east of Idaho and 65 miles south of the Canadian border (Figure 1-1). It is at an elevation of approximately 2,580 feet above mean sea level (msl) and lies in a valley carved by the Kootenai River and bounded by the Cabinet Mountains to the south.

Libby is the Lincoln County seat and has a population of less than 3,000. Twelve thousand people live within a ten-mile radius of Libby. Although Libby's economy is still largely supported by natural resources such as logging and mining, there are also many tourist and recreational opportunities in the area. The source of LA, Vermiculite Mountain, is an open pit mine located approximately 7 miles northwest of Libby.

Figure 1-1 presents a map showing the entire NPL Site and boundaries of all OUs. This FFS addresses OU5, which is located south of the incorporated limits of Libby and contains the former Stimson Lumber Mill and all properties owned by KBPID. Operable Unit 5 is relatively flat and slopes slightly towards the north-northeast. It encompasses approximately 400 acres and includes a number of commercial and industrial buildings as well as areas used for recreation.

The OU5 boundary also encompasses the unrelated Libby Groundwater Superfund Site, which has been on the NPL since September 1983 due to groundwater contamination resulting from wood preservative processing (Figure 1-2). Libby Creek traverses the western portion of OU5, but is not part of OU5 (included in OU4). Therefore, it will not be discussed further in this report.

## 1.3. NPL SITE HISTORY

Libby is located near a large open-pit vermiculite mine on Vermiculite Mountain. Vermiculite is mica-like mineral that can be processed for use as an insulating material or soil amendment and has been mined in Libby since 1919. It is estimated that the Libby mine was the source of over 70 percent of all vermiculite sold in the U.S. from 1919 to 1990. Over its lifetime, it employed more than 1,900 people. W. R. Grace bought the mine and processing facility in 1963 and operated it until 1990 (EPA, 2010a)

Vermiculite from this mine contains varying levels of amphibole asbestos, consisting primarily of winchite and richterite, with lower levels of tremolite, magnesioriebeckite, and possibly actinolite. Because existing toxicological data are not sufficient to distinguish differences in toxicity among these different forms, EPA does not believe that it is important to attempt to distinguish among these various amphibole types. Therefore, EPA simply refers to the mixture as Libby amphibole (LA) asbestos.

**Comment [LC17]:** This is not used again, is it necessary to make an acronym?

**Deleted:** Kootenai Business Park Industrial District (

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Comment [BK18]: I suggest adding a more detailed description of the OU-5 boundaries. Possibly text explaining OU6 to the north and OU8 to the south.

**Comment [LC19]:** I like that this is spelled out here – much more impact for the "name" -

Historic mining, milling, and processing operations as well as bulk transfer of mining-related materials, tailings, and waste to locations throughout the Libby Valley are known to have resulted in releases of vermiculite and LA to the environment. This has caused a range of adverse health effects in exposed people, including individuals who did not work at the mine or processing facilities

EPA has been working in Libby since 1999 when an Emergency Response Team was sent to investigate local concern and news articles about asbestos-contaminated vermiculite. Since that time, EPA has been working closely with the community to clean up contamination and reduce risks to human health.

In light of evidence of human asbestos exposure and associated increase in health risks, it was recommended that EPA take appropriate steps to reduce or eliminate exposure pathways to these materials to protect area residents and workers. EPA placed the Libby Asbestos Site on the NPL in October 2002 and due to its large size, subdivided the Site into eight Operable Units (OUs; Figure 1-1):

- OU1 Former Export Plant
- OU2 Former Screening Plant
- OU3 Mine Site
- OU4 Residential and commercial properties in and around Libby
- OU5 Former Stimson Lumber Mill
- OU6 Rail Line
- OU7 Residential and commercial properties in and around Troy
- OU8 US and Montana State highways and secondary highways in the vicinity of Libby and Troy, Montana.

#### 1.4. OU5 HISTORY AND DESCRIPTION

OU5 is also referred to as the former Stimson Lumber Mill site, as many lumber processing facilities were located throughout. The J. Neils Lumber Company began wood treating operations at OU5 in approximately 1946. The lumber company and wood treating operation was purchased by St. Regis Corporation in 1957. Champion International Corporation purchased the facility in 1985 who then sold it to Stimson Lumber Company in 1993.

The majority of lumber production activities ceased in 2003 when Stimson Lumber Company sold the property to Lincoln County Port Authority and ownership was subsequently transferred to the current owner, KBPID. <u>OU5</u> is currently being redeveloped for a variety of uses, both recreational and industrial.

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Figure 1-3 shows former and current land uses and buildings throughout OU5 that existed in June 2010. One of the largest structures at OU5, the Plywood Plant, was entirely destroyed by fire in early 2010.

During interviews conducted in 2001, three specific outdoor subareas of interest were identified (CDM, 2007) due to potential vermiculite (and associated LA) contamination concerns (Figure 1-3):

- The former Popping Plant was once used as an aboveground storage area for uncontained vermiculite ore. Ore was stockpiled directly on the native soil surface in this area.
- The Railroad Spur was used for shipping raw and unprocessed vermiculite material to and from OU5.
- The former Tree Nursery may have introduced raw vermiculite product into this area as a growth medium and fill material.

Additionally, waste bark piles remain from historical lumber processing activities at OU5.

Under current conditions, OU5 is used mainly for commercial/industrial purposes. Portions of <u>OU5</u> are used for recreational purposes. This includes an area that has been developed as a Moto-Cross (MotoX) Park for dirt bike riding, and a trail along Libby Creek that is popular for hiking and bicycle riding. These features are illustrated on Figure 1-3.

Currently, there is no residential land use on OU5. However, a residential area (part of OU4) lies adjacent to the former Plywood Plant as shown on Figure 1-2. In addition, residential neighborhoods surround OU5 to the west and northwest.

Redevelopment plans are currently being formulated for OU5. The Kootenai River Development Counsel was recently awarded a grant to upgrade the rail lines and electrical system throughout OU5. Plans have also discussed development of a walking path and fishing pond in the northeast corner of OU5 near Libby Creek.

Limited tree and grass plant species are located within OU5, primarily along the northern boundary and surrounding Libby Creek. The majority of OU5 is un-vegetated (CDM, 2009a) and suitable for industrial/commercial development.

#### 1.5. REGULATORY HISTORY

The following is a brief chronological summary of major regulatory actions taken at the <u>NPL</u> Site.

- 1999 Local concern alerts EPA to investigate asbestos in and around Libby, Montana
- 2002 Libby Asbestos Site proposed for the NPL
- 2002 Libby Asbestos Site formally added to the NPL

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• 1999 through 2009 – Response actions taken to remove asbestos and vermiculite containing material throughout OU5.

EPA has not entered into any enforcement agreements or issued any orders for investigation, removal, or remedial work at any part of OU5. The Stimson Lumber Company removed some loose and accessible vermiculite insulation in 2002 and 2003. EPA contractors have taken samples at OU5 many times beginning in 2002. EPA removed vermiculite insulation from a portion of the roof and walls at the Central Maintenance Building in 2005 and contamination from surface soils in 2009. None of these actions were taken pursuant to enforcement, EPA entered into a site wide settlement with the only Potentially Responsible Party (PRP) for OU5, W. R. Grace, in 2008. That agreement provided for a cash settlement of past and future response costs for the entire Libby NPL Site except OU3, the mine site, which W.R. Grace owns.

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## 2. SUMMARY OF SITE CHARACTERISTICS

#### 2.1. CLIMATE

Annual average precipitation in Libby is 24.7 inches, with an annual average of 105 inches of snowfall (WRCC, 2010). Precipitation and humidity in Libby are greatest during the winter months due to the presence of temperature-regulating Pacific air masses. In December and January, average temperatures range between 25-30 °F. Occasionally, dry continental air masses occupy the Libby area for short periods of time during the winter, creating cold and less-humid conditions (CDM, 2009a).

Fog is common in Libby during winter months and in early morning throughout the year. Summer months are dryer and warm with occasional rainfall. The average July temperature ranges between 56-70 °F, with an average high of 80 °F (CDM, 2009a).

Prevailing winds are from the west north-west and average approximately 6-7 miles per hour. Wind direction and velocities fluctuate depending on temperature variances caused by vertical relief in the area. Inversions often trap stagnant air in the Libby valley (CDM, 2009a).

#### 2.2. GEOLOGY

Regional geology in the Libby valley is comprised of lacustrine deposits underlain by Precambrian rocks. Surrounding mountains are formed by Precambrian rocks. Cliffs along the lower portion of the valley are formed by glacial lake bed deposits. The Kootenai River and Libby Creek cut through lacustrine and alluvial deposits and form a discontinuous sequence of gravel, sand, silt, and clay (EPA, 2010b).

Alluvial deposits extend from the surface to 190 feet (ft) below ground surface (bgs) and are comprised of sand, gravel, silt, clay and cobbles. Glacial till, which consist primarily of silt and clay with varying amounts of sand and gravel underlies alluvial deposits. Deposits of glacial till are believed to be quite deep, occurring at depths exceeding 500 ft bgs (EPA, 2010b).

Soils in the Libby area typically are loamy soil composed of sand and silt with minor amounts of clay. Soil was formed by erosion of pre-Cambrian rocks, downstream transport of clays with rivers and creeks, and organic matter from historically forested areas (CDM, 2009a).

Soils at OU5 are a combination of historical soil modified in areas by human activities. These
activities may include addition of vermiculite as a soil amendment, soil reworking for building
construction, road and railroad operation, vermiculite processing and transport, and general
work. Deleted: site

#### 2.3. HYDROLOGY AND HYDROGEOLOGY

Libby Creek (which is part of OU4) runs through the eastern portion of OU5 and terminates in the Kootenai River, which flows just outside the northern OU5 border. The Kootenai River originates in British Columbia, Canada, and flows through Montana and Idaho before returning to Canada and flowing into the Columbia River. Flows in the Kootenai River and Libby Creek are tied to runoff from mountains surrounding Libby. Runoff peaks in spring when high-elevation snow begins to melt. Stream flow decreases in summer due to low precipitation and snowmelt flow moderation by high elevation lakes (CDM, 2009a).

Beneath OU5, saturated alluvial deposits extending from the surface to approximately 190 ft bgs have been sorted into three classifications: upper aquifer, intermediate zone, and lower aquifer. The upper aquifer contains high hydraulic conductivity material including silty gravel and sand with occasional interbedded clayey, silty deposits. It is unconfined and extends from the water table (5 to 30 ft bgs) to approximately 70 ft bgs. Hydraulic conductivity ranges from 100 to 1,000 feet per day (ft/day). Inferred groundwater flow direction is north-northwest towards the Kootenai River (EPA, 2010b).

The intermediate zone is comprised of low permeability deposits similar to the upper aquifer, but with a higher percentage of fine-grained material. Acting as a confining layer, the intermediate zone is 40 to 60 ft thick, extending from approximately 60-70 ft bgs to 110 ft bgs. The hydraulic conductivity of this layer is much lower than the upper aquifer at approximately 1 ft/day.

The lower aquifer extends from approximately 100 ft bgs to 190 ft bgs, and contains more low-permeability silt and clay layers than the upper aquifer. It is confined and under pressure, so water in wells screened in this aquifer rise to 14-26 ft bgs. Hydraulic conductivity of the lower aquifer ranges from 50 to 200 ft/day. Inferred groundwater flow direction is north-northwest towards the Kootenai River (EPA, 2010b).

## 2.4. NATURE AND EXTENT OF LA

#### 2.4.1. Contaminant of Concern

The contaminant of concern at the Libby Site is asbestos. Asbestos is the generic name for the fibrous form of a broad family of naturally occurring poly-silicate minerals. Based on crystal structure, asbestos minerals are usually divided into two groups - serpentine and amphibole.

<u>Serpentine</u> - The only asbestos mineral in the serpentine group is chrysotile. Chrysotile is the most widely used form of asbestos, accounting for about 90% of the asbestos used in commercial products (IARC, 1977). There is no evidence that chrysotile occurs in the Libby vermiculite deposit, although it may be present in some types of building materials in Libby.

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<u>Amphibole</u> – Five minerals in the amphibole group that occur in the asbestiform habit have found limited use in commercial products (IARC, 1977), including actinolite, amosite, anthophyllite, crocidolite, and tremolite.

At the Libby Site, the form of asbestos that is present in the vermiculite deposit is amphibole asbestos that for many years was classified as tremolite/actinolite (McDonald et al., 1986, Amandus and Wheeler, 1987). More recently, the U.S. Geological Survey (USGS) performed electron probe micro-analysis and X-ray diffraction analysis of 30 samples obtained from asbestos veins at the mine (Meeker et al., 2003). Using mineralogical naming rules recommended by Leake et al. (1997), the results indicate that asbestos at Libby includes a number of related amphibole types. The most common forms are winchite and richterite, with lower levels of tremolite, magnesioriebeckite and possibly actinolite.

Because mineralogical name changes that have occurred over the years do not alter the asbestos material that is present in Libby, and because EPA does not find that there are toxicological data to distinguish differences in toxicity among these different forms, the EPA does not believe that it is important to attempt to distinguish among these various amphibole types. Therefore, EPA simply refers to the mixture as Libby amphibole (LA) asbestos.

#### 2.4.2. Sampling

Investigations at OU5 began in May of 2002 and continued through 2009. During this period the following media-specific sampling was conducted:

- Air
  - Personal air samples collected using a sampling pump and filter located in the breathing zone of an individual while performing various activities indoors or outdoors
  - > Stationary air samples collected using a stationary sampling pump and filter placed either indoors or outdoors.
- Dust standing dust samples collected from horizontal surfaces inside buildings.
- Soils
  - ➤ Surface composite and grab samples collected from 0 to 6 inches bgs.
  - ➤ Sub-surface composite and grab samples collected 6 or more inches bgs in limited locations where buried LA containing materials were suspected.
- Waste Bark material samples from existing waste pile shown on Figure 1-3.

As discussed in Section 2.5, inhalation of air is considered to be the most direct route of exposure to LA and is therefore the primary medium of concern. Scripted air sampling activities were determined to provide the most meaningful measure of human exposure to LA in air at OU5 (EPA, 2008).

Scripted activities required the sampler and/or equipment to perform a written script such <u>as</u> a specific office work routine while wearing a sampling pump and filter cassette in a building with current use as an office. Data generated from scripted sampling was used to estimate human health risks at OU5 (Section 2.5) and is referred to in the remainder of this report as Activity-Based Sampling (ABS). ABS air sampling was conducted in occupied and unoccupied structures as well as in outdoor areas (Outdoor Worker ABS) to assess worker exposure to airborne LA fibers as a result of worker disturbance of surface soils (and waste bark produced as a by-product of lumber milling)

Most soil sampling at OU5 involved surface soils and included 12 separate investigative phases/events. Prior to selecting the locations for Outdoor Worker ABS events, all existing OU5 surface soil data were examined to discern trends in spatial variability of LA or vermiculite occurrence. The purpose of this exercise was to allow selection of Outdoor Worker ABS locations that represented a range of surface soil contamination.

Once outdoor ABS locations were selected, those areas were subject to additional surface soil sampling. All ABS areas were characterized by collecting and analyzing at least 30 individual grab samples and then also analyzing a 30-point composite sample comprised of the grabs. Most samples were analyzed to determine presence of LA.

#### 2.4.3. Sample Analyses

In the past, the most common technique for measuring asbestos in air was phase contrast microscopy (PCM). In this technique, air is drawn through a filter and airborne particles become deposited on the face of the filter. All structures that have a length greater than 5 micrometers (um) and have an aspect ratio (the ratio of length to width) of 3:1 or more are counted as PCM fibers. The limit of resolution of PCM is about 0.25 um, so particles thinner than this are generally not observable.

A key limitation of PCM is that particle discrimination is based only on size and shape. Because of this, it is not possible to classify asbestos particles by mineral type, or even to distinguish between asbestos and non-asbestos particles. For this reason, nearly all samples of air collected in Libby are analyzed by transmission electron microscopy (TEM).

This method operates at higher magnification (typically about 20,000x) and hence is able to detect structures much smaller than can been seen by PCM. In addition, TEM instruments are fitted with accessories that allow each particle to be classified according to mineral type.

Soil samples were analyzed using <u>polarized light microscopy</u> (PLM) whereby the analyst estimates the amount of asbestos in the sample (expressed as percent by weight) based on visual estimation techniques and by comparison to reference materials. Figures illustrating the occurrence of LA at OU5 (Section 2.4.4) use a 4-color scheme to indicate the amount of LA present in a sample:

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- green = non-detect
- yellow = trace
- orange = < 1%
- red =  $\geq 1\%$

Additional detail on analytical reporting is provided in the RI Report (HDR, 2010).

For soil samples, field teams also provide a semi-quantitative estimate of visible vermiculite present at soil sampling point(s). These estimates were used to characterize the level of vermiculite (and presumptive LA contamination) in an area and considers both frequency and level of vermiculite. This is achieved by assigning a weighting factor to each level, where weighting factors are intended to represent relative levels of vermiculite in each category as follows:

Visible Vermiculite Level (L <sub>i</sub> )	Weighting factor (W <sub>i</sub> )
None	0
Low	1
Moderate	3
High	10

The composite score is then the weighted sum of the observations for the area:

$$Score = \frac{\sum_{i=1}^{30} L_i * W_i}{30}$$

This value can range from zero (all 30 points are "none") to a maximum of 10 (all 30 points are "high"). For example, an ABS area with 1 "low" point and 29 "none" points would receive a value of 1/30 = 0.033, while an ABS area with 24 "intermediate" points and 5 "high" would receive a score of  $(24\cdot3 + 5\cdot10)/30 = 4.13$ .

Figures illustrating the occurrence of visible vermiculite at OU5 (Section 2.4.4) use a 4-color scheme to indicate the visible score data:

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- green = score of 0 (no visible detected)
- yellow = score < 0.1
- orange = score 0.1 to < 0.3
- red = score > 0.3

Additional details on development of visible vermiculite scores may be found in the RI Report (HDR, 2010).

In addition to the visual estimation method described above, field crews used a less sophisticated technique prior to 2006. This involved noting in the field the simple presence or absence of visible vermiculite in soil samples.

Waste bark samples were analyzed by adding a sample of test material to water, shaking, and allowing the sample to separate into "sinks" (mineral particles that settle to the bottom), "floats" (particles of wood that rise to the top), or "suspended" (particles that remain in the water). The "sinks" are collected, dried, and analyzed using a qualitative analysis method utilizing PLM and TEM. If no fibrous amphibole is detected in the "sinks", then a sample of the water is analyzed by TEM for suspended amphibole. If fibrous amphibole is detected in either fraction, the sample is reported as "detect". If fibrous amphibole is detected in neither fraction, the sample is reported as "non-detect".

#### 2.4.4. Extent of LA

## 2.4.4.1. LA IN AIR

The amount of LA fibers released to air will vary depending upon the level of LA in source material (e.g., outdoor soil, indoor dust) and intensity and duration of a disturbance activity. Because of this, predicting LA levels in air associated with disturbance activities based only on measured LA levels in source material is extremely difficult. Therefore, ABS is considered to be the most direct way to estimate potential exposures from inhalation of asbestos. ABS results for indoor and outdoor air are summarized on Figures 2-1 and 2-2, respectively.

### Indoor Air

Figure 2-1 summarizes ABS results for existing buildings except those that have fewer than four walls or have a dirt floor. In addition, no ABS air data is available for the Finger Jointer Process Plant.

Samples from most vacant buildings contained no detectable LA. Samples from most occupied buildings contained detectable LA. For buildings where LA was detected, the mean

concentration varied by a factor of 1,000. Human health risk estimates based on these measurements are provided in Section 2.5.

#### Outdoor Air

Figure 2-2 summarizes results for the eight Outdoor Worker ABS locations and ABS conducted along the bicycle path and at the MotoX Park. LA was detected in seven of the eight Outdoor Worker ABS areas. The mean LA concentration varied by a factor of 10 across the seven areas where LA was detected.

Sampling at the MotoX Park included stationary samplers proximal to the location of spectators as well as samplers fixed to handlebars of dirt bikes. No LA fibers were detected in any sample.

Sampling was conducted separately for paved and unpaved portions of the bike path. On the paved path, a stationary air monitor was also mounted in a trailer attachment to one of the bicycles to characterize potential exposures to a young child being pulled by a parent. Samples from the trailer were not collected from the unpaved portion of the path because the unpaved portion of the path is steep and narrow in sections, and is not safe for pulling a trailer. The mean LA concentrations for the adult and child were similar. Human health risk estimates based on these measurements are provided in Section 2.5.

#### 2.4.4.2. LA IN DUST

Figure 2-3 illustrates buildings that have been sampled for indoor dust and presents the total LA dust loading results relative to the current EPA removal action level for indoor dust (> 5,000 total LA s/cm²; EPA, 2003).

Of the 87 indoor dust field samples collected, 28 samples had detectable levels of LA, with detectable levels ranging from 35 to 44,116 total LA s/cm<sup>2</sup>. Only four samples had detectable levels of LA above the current EPA removal action level:

<u>Former Tree Nursery area shed</u> – Total LA dust loading was 7,026 s/cm<sup>2</sup> for one composite sample collected in May 2002 from sampling locations atop wood piles and from a ground level beam in this shed. This building was no longer present during the 2007 site visit (CDM, 2007).

<u>Central Maintenance Building</u> – Total LA dust loading was 8,823 s/cm<sup>2</sup> for one of 29 composite samples collected from this building in September 2002. This sample was collected from two engine rooms and the main work area. The source of dust contamination in this building was likely vermiculite insulation and vermiculite-containing building materials which were subsequently removed in 2005 (CDM, 2007).

<u>Diesel Fire Pump House</u> – Total LA dust loading was 8,823 s/cm<sup>2</sup> for one composite sample collected from three areas within this building in September 2002.

<u>Guard Station at Libby Creek Bridge</u> – Total LA dust loading was 44,116 s/cm<sup>2</sup> for one composite sample collected from this building in September 2002. The guard station did not contain vermiculite insulation at the time of sampling (CDM, 2007). This building was no longer present during the 2007 site visit (CDM, 2007).

The Central Maintenance Building has been cleaned several times to remove LA impacted building material and to decontaminate interior surfaces. Subsequent ABS air sampling of buildings that remain as of June 2010 (Central Maintenance Building and Diesel Fire Pump House) indicated that risks to human health are below a level of concern (See Section 2.5).

#### 2.4.4.3. LA IN SOIL

### Surface Soil

Figure 2-4 illustrates LA occurrence in OU5 surface soils based on PLM results. In this figure, individual grab samples (primarily collected within the Outdoor Worker ABS areas) are shown as triangles, and composite samples are shown as circles plotted at the mid-point of the area over which the sample was composited. Figure 2-5 illustrates vermiculite occurrence in OU5 soils based on visual vermiculite inspection results.

The color scheme used to represent the relative amounts of LA or vermiculite on the figures is described in Section 2.4.3 as well as in the RI Report (HDR, 2010).

As shown in Figure 2-4, PLM results are generally non-detect or trace across OU5. One location where PLM results have consistently been higher (with observed LA levels up to 1%) is the north-central portion of the former Tree Nursery area. This location also has elevated visible scores (see Figure 2-5).

Differences in more recent visual vermiculite results (ABS results) compared to original results likely arises from the inherently subjective nature of the category assignments, as well as variations in site conditions between rounds (e.g., cloud cover vs. sunshine, amount of ground cover, soil moisture, etc.).

## Subsurface Soil

PLM and visual inspection results for subsurface soils are presented on Figure 2-6. LA was not detected in any composite sample collected near the former Popping Plant (where buried vermiculite was suspected) or in other samples scattered across the remainder of OU5. LA was reported as <1% in a single composite sample collected along the railroad spur (where buried vermiculite was suspected).

LA was not detected in any grab sample collected as part of an investigation of the Libby Groundwater Site. Visible vermiculite was noted as "moderate" in a single sample. Unlike the visible vermiculite score used to describe the relative level of vermiculite in composite samples, results for individual grab samples is expressed as none, low, moderate or high.

These results suggest that, in areas examined, the occurrence of LA or vermiculite does not increase with depth.

#### 2.4.4.4. LA IN WASTE BARK

Of the 19 waste bark samples analyzed, LA was detected in 1 sample analyzed by PLM, and LA was detected in 13 samples by TEM. These results show that LA is present in these piles, but it is not possible to quantify how much LA may be present based on the qualitative method used for waste bark (See Section 2.4.3).

### 2.5. HUMAN HEALTH RISK ASSESSMENT

People who visit or work at OU5 may be exposed to LA by incidental ingestion of contaminated media (e.g., soil, dust, water) and by inhalation of air that contains LA fibers. Of these two pathways, inhalation exposure is considered to be of greatest concern. To the extent that incidental ingestion exposure of LA may occur, the added risk from this pathway is expected to be small compared to the risk from the inhalation pathway.

The risk assessment used available data to estimate health risks to people who may inhale asbestos in air while working in or visiting OU5, either now or in the future, based on currently existing conditions within OU5. The value of the exposure point concentration (EPC) term, which is used to estimate risk, is based on measurements of asbestos concentration levels measured in air.

Methods used to evaluate human health risks from asbestos are in basic accord with EPA guidelines for evaluating risks at Superfund sites, including recent guidance that has been specifically developed to support evaluations of exposure and risk from asbestos.

At present, EPA is working to derive a reference concentration (RfC) for inhalation exposure to LA, but this value is still under development and is not yet available for use in estimation of Hazard Quotient (HQ) values, which are used to estimate non-cancer risk. Therefore, no quantitative evaluation of non-cancer risk was included in the risk assessment.

EPA has collected sufficient data to allow evaluation of exposure pathways that are thought to be most likely to be of potential concern in OU5. These pathways are the main focus of the risk assessment and include:

- Exposure of indoor workers to residual LA in indoor air of existing buildings.
- Exposure of outdoor workers to residual LA in outdoor soil.
- Exposure of motorcycle riders and spectators at the Moto-Cross (MotoX) Park.
- Exposure of bicycle riders along the recreational trail.

Acceptable and unacceptable excess lifetime risks of cancer are defined by Office of Solid Waste and Emergency Response (OSWER) Directive 9355.0-30 and described below:

o Negligible: <1E-6

o Generally acceptable: 1E-4 – 1E-6

o Not sufficiently protective and warrants remedial action: >1E-4

The Baseline Risk Assessment findings from the RI Report (HDR, 2010) for cancer risk, grouped by exposed population, are summarized below:

- ABS air sampling was conducted in all existing buildings (as of June 2010) except the
  Finger Joiner Processing Plant. Excess cancer risk estimates are within or below EPA's
  acceptable risk range of 1E-4 to 1E-6 for all sampled buildings, indicating that indoor
  worker exposures at these buildings are likely to be of relatively low concern.
- Cancer risk estimates for workers exposed to outdoor air during soil disturbance activities
  in each ABS area are within or below EPA's acceptable risk range. Therefore, outdoor
  worker exposures to LA from disturbing soil in these ABS areas are likely to be of
  relatively low concern.
- Estimated cancer risks for both riders and spectators at the Moto-X Park are within or below EPA's acceptable risk range. These results support the conclusion that inhalation of outdoor air at the Moto-X Park is unlikely to be a source of significant excess cancer risk to either Moto-X riders or spectators.
- Estimated cancer risk estimates for both adults and children exposed to outdoor air while
  biking along the recreational path are below EPA's acceptable risk range. These results
  support the conclusion that inhalation of outdoor air along the recreational path is
  unlikely to be a source of significant excess cancer risk.
- Estimated cancer risks for workers exposed to outdoor air during waste bark pile
  disturbance activities are within EPA's acceptable risk range. These results support the
  conclusion that inhalation of outdoor air near disturbances of the waste bark piles is
  unlikely to be a source of significant excess cancer risk to outdoor workers.

The risk assessment concluded that Cancer risk estimates based on measured LA concentrations in air are within or below EPA's acceptable risk range for indoor and outdoor workers, as well as recreational visitors along the bike path and at the MotoX Park. These results suggest that recreational and occupational exposures at OU5 are likely to be of low concern. However, it is important to note that most people who visit or work in OU5 are likely to be exposed to LA by a number of different exposure pathways, and that risk management decision-making should consider the sum of the risks across all pathways, not just those evaluated in the OU5 risk

Comment [LC20]: Suggest changing scientific notations to numbers for the general public to understand throughout document.

**Comment [LC21]:** Need closing quotes somewhere in the paragraph.

assessment. A summary of the uncertainties associated with the risk estimates can be found in the OU5 RI Report (HDR, 2010).

An ecological risk assessment is being developed for the mine site (OU3). EPA will build upon the information gathered during that ecological risk assessment to identify potential pathways and receptors to evaluate ecological risk at OU5.

Comment [LC22]: If any time-frame is available or at least a guarantee that this will be done even post-ROD would be helpful here.

### 3. REMEDIAL ACTION OBJECTIVES

#### 3.1. INTRODUCTION

The human health risk assessment concluded that LA in soils and existing buildings do not present a cancer risk above a level of concern under current land uses and building occupancy. This conclusion is affected by use changes that result in an increase in duration of daily occupancy, change in indoor activities, etc. Therefore, response actions considered in this FFS seek to minimize the likelihood of uncontrolled changes in land use or building occupancy. Response actions may also seek to further lower estimated cancer risks under current or future land uses and building occupancy.

### 3.2. CONTAMINANT, OF CONCERN

As discussed in section 2.4.1, the only COC at OU5 is LA, a mixture of various species of amphibole asbestos associated with vermiculite mined at the Libby Mine.

#### 3.3. MEDIA OF CONCERN

Environmental media that contain LA at OU5 include:

- Surface and subsurface soils
- Dust on interior surfaces of existing buildings
- Wood chips

Disturbance of these contaminated media transfer LA fibers into the air where human exposure may occur via inhalation.

## 3.4. MIGRATION PATHWAYS OF CONCERN

LA fibers are released into the air when vermiculite-containing material is disturbed. These fibers will settle out and accumulate on the surrounding media (soil, interior surfaces, etc.) where they can be re-suspended. Migration pathways of concern at OU5 include:

- LA released into the air from soil disturbance activities
- LA released into the air after disturbance of dust on interior surfaces

These migration pathways are considered relevant for the FFS.

#### Comment [LC23]:

I copied language from later in the document just to help qualify the statement.

And this matters when the specific parameters of the dose and exposure hours are calculated in the risk assessment, right? Since there are not separate risk numbers for residential versus commercial, just dose and exposure values.

So even if there are changes to land use or building occupancy they may still be fine. So is this something we need to look into before blanketing IC's across the entire area?

Not sure this requires any changes to the document – just a thought for future ICs.

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## 3.5. REMEDIAL ACTION OBJECTIVES

Based on the foregoing, the single Remedial Action Objective for OU5 is:

1. Prevent unacceptable human exposure to LA fibers.

### 4. PREVIOUS RESPONSE ACTIONS

EPA established a program to inspect all properties in Libby and to remove as many LA source areas as possible from all OUs. As of April of 2009, EPA has safely removed over 600,000 cubic yards of asbestos-contaminated materials from major source areas and buildings. Contaminated soils are transported to the former Libby Mine site and contaminated construction debris is placed in a specially designed landfill cell. These disposal sites are secured and will remain off-limits to human contact. Recent response efforts have focused on residences and businesses. Currently, the EPA is transitioning from emergency removal activity to the Remedial Process (EPA, 2010a).

Beginning in October 2006, EPA implemented the Environmental Resource Specialist (ERS) program for the entire Libby Superfund Site, including OU5. This program was set up to assist with unplanned and urgent exposures to vermiculite attic insulation due to its association with LA. The ERS program provides a full-time service where property owners, firemen, and other affected personnel or citizens can obtain access to LA expertise outside the normal course of scheduled removal and/or remedial actions.

In an effort to determine the extent of LA occurrence at OU5, there have been multiple sampling investigations conducted since 2002. These investigations are discussed in Section 2 of this report as well as the OU5 RI Report (HDR, 2010). A number of response actions have been completed to date and are summarized in Table 4-1. Those buildings and land areas subjected to prior response actions that remain at OU5 are illustrated on Figure 4-1.

As shown on Table 4-1, most actions have been performed by asbestos abatement companies privately contracted by Stimson Lumber Company and have focused on removal/containment of asbestos materials in OU5 buildings. EPA directed the removal action at the Central Maintenance Building.

The only known source of residual indoor vermiculite is at the Central Maintenance Building, where remnants of vermiculite insulation remain in wall cavities (CDM, 2007). However, the possibility exists for residual vermiculite to be present in other OU5 buildings.

In addition to addressing vermiculite (and associated LA) in buildings, EPA performed other response actions including two involving OU5 soils and a third that may have impacted OU5 soils (Figure 4-1):

- OU5 Redevelopment Area Soil characterization and limited soil removal in an area west of the Pipe Shop.
- Central Maintenance Building Removal of vermiculite-containing building and other materials by vacuum methods, from the edge of the walls and outward approximately 45 feet.

Comment [LC24]: Structure is confusing with an asbestos structure during counting rules.

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**Comment [LC25]:** Is it really just attic insulation or any vermiculite suspected or sampled to contain LA – like what is used in yards?

Please clarify or expand this sentence.

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• Libby Creek Remediation Area – Removal and replacement of rip-rap on the east bank of Libby Creek. Libby Creek is a part of OU4 as it traverses OU5. However, a portion of the response action may have encroached onto OU5 on the east bank of the creek.

In addition, EPA installed a chain-link fence to isolate the former Tree Nursery area (CDM, 2007)

**Comment [LC26]:** Is this an engineering control that needs to be maintained? Is this still present? Please clarify in the text.

### 5. ARARs

## 5.1. DEFINITION OF ARARS

Remedial actions must attain a general level of cleanup that is protective of human health and the environment, is cost-effective, and uses permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practical. In addition, the Superfund Amendments and Reauthorization Act (SARA) requires that any hazardous substance or pollutant and contaminant remaining on site meet the level or standard of control established by ARAR standards, requirements, criteria, or limitations established under any federal environmental law, or any more stringent standards, requirements, criteria, or limitations promulgated in accordance with a state environmental statute.

A requirement may be either applicable or relevant and appropriate to remedial activities at a site (but not both). Applicable requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstances at a site. In other words, they would be legally applicable notwithstanding the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

If a requirement is not applicable, it may still be relevant and appropriate. The basic considerations are whether the requirement (1) regulates or addresses problems or situations sufficiently similar to those encountered at the subject site (i.e. relevance), and (2) is appropriate to the circumstances of the release or threatened release, such that its use is well suited to the particular site. A requirement might be relevant but not appropriate for a specific site; in this case, the requirement would not be an ARAR. Determining whether a requirement is relevant and appropriate is site-specific and must be based on best professional judgment. This judgment is based on a number of factors including the characteristics of the remedial action, the hazardous substances present at the site, and the physical circumstances of the site and of the release.

Compliance with all requirements found to be applicable or relevant and appropriate is required under SARA. Waivers of ARARs may be obtained under the provisions of SARA under certain circumstances (CERCLA Section 121(d)(4)). These waivers apply only to meeting ARARs with respect to remedial actions on-site; other CERCLA statutory requirements, such as the requirements that remedies be protective of human health and the environment cannot be waived. Chemical, Location, and Action Specific ARARs for OU5 are summarized on Tables 5-1 thru 5-3.

As discussed in Sections 6 and 7, remedial alternatives that are retained after the screening step do not involve disturbance of structures or terrain. The alternatives recognize the existence of

Comment [BK27]: I don't agree that OSHA is the only potential applicable ARAR. Isn't the whole point of placing ICs on the site to manage/control future land use changes? If excavations or demolitions do occur on the property, and other uses are allowed, other legal requirements may be applicable or relevant and appropriate.

Please note that EPA and DEQ attorneys are still working on the potential ARARs and will provide prior to finalization of this document.

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Comment [BK28]: ICs (Alternative 2) are designed to manage future development of OU-5. It is unrealistic to assume the site will remain undisturbed indefinitely.

certain programs currently in place (or those that may be established in the future) to address the unanticipated discovery of vermiculite in structures or soils throughout the Libby NPL Site. These programs, including the ERS program, may initiate or respond to actions that disturb structures or terrain. However, such programs are not OU5 remedial actions and so are not considered when developing OU5 ARARs in this FFS Report. This is discussed further in Section 7.

# 6. DEVELOPMENT AND SCREENING OF REMEDIAL ALTERNATIVES

#### 6.1. INTRODUCTION

In this Section the short- and long-term aspects of the following three criteria are used to screen remedial alternatives for OU-5:

# 1. Effectiveness

This criterion focuses on the degree to which an alternative reduces the toxicity, mobility, or volume through treatment, minimizes risks and affords long-term protection, complies with applicable or relevant and appropriate standards (ARARs), minimizes short-term impacts, and how quickly it achieves protection.

#### 2. Implementability

This criterion focuses on the technical feasibility and availability of the technologies each alternative would employ and the administrative feasibility of implementing the alternative.

#### 3. Cost

The costs of construction and any long-term cost to operate and maintain the alternative shall be considered. Costs that are grossly excessive compared to the overall effectiveness of the alternative may be used to eliminate alternatives. The relative cost of each alternative is described as low, medium, and high.

Alternatives that are retained after the screening step are advanced to the detailed and comparative analysis steps of the FS process (Sections 7.0 and 8.0, respectively).

#### 6.2. WASTE VOLUME ESTIMATES AND RATIONAL

Cancer risk estimates at OU5 are within EPA's acceptable risk range of 1E-4 to 1E-6. This is true for occupied and unoccupied structures as well as for workers exposed to LA in surface soils under current commercial and industrial land uses as well as most areas where current land use is recreational. One exception is recreational use of paved and unpaved bicycle paths along Libby Creek where risks to adults and children are less than 1E-6. EPA considers cancer risks below 1E-6 to be negligible.

Risks to hypothetical future residents were not calculated because anticipated future land uses are the same as current land uses.

**Deleted:** remedial alternatives considered for OU5 are described and screened against the

**Comment [BK29]:** This language is more consistent with the language in 40CFR 300.430

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Comment [BK30]: Please note: the State's acceptable cancer risk level is <1X10-5. It would be helpful to note the difference in the document but still recognize EPA's range as driver for action.

Given that cancer risk estimates are within EPA's acceptable range for current land use, remedial alternatives that involve actions to further lower cancer risk are developed for comparison with alternatives that seek to maintain the current level of protectiveness. Remedial alternatives that seek to further lower cancer risk may not be necessary to achieve an acceptable level of protectiveness of human health at OU5.

Estimate of Waste Soil Volume

For purposes of the FFS, OU5 waste consists of surface and subsurface soil. Surface soil is known to contain LA fibers. Although subsurface soil samples generally were non-detect for LA, the presence of LA in several subsurface soil samples coupled with the limited number of subsurface soil samples collected precludes elimination of subsurface soil as an OU5 waste.

All areas of OU5 present an estimated cancer risk below a level of concern (<1E-4). Therefore, alternatives that seek to further reduce cancer risks to negligible levels (<1E-6) at OU5 would be implemented across the entire OU. Such actions might include excavation and/or replacement of near-surface soils to create a clean soil barrier.

Construction of a clean soil barrier would differ in developed portions of OU5 as compared with undeveloped areas. In developed areas, it would be necessary to excavate existing soils prior to placement of clean fill and topsoil to allow access to buildings and ensure proper drainage. In undeveloped areas, a soil barrier could be placed directly on existing ground.

Therefore, waste quantity estimates are limited to soils from the surface to a depth of one-foot in developed areas of OU5 (Figure 6-1). Selection of a one-foot excavation depth is consistent with similar remedial alternatives developed for OU1 (CDM, 2009b). Actual waste quantities would be determined during remedial design should an alternative involving earthwork be selected.

Based on the approximately 40 acre developed area of OU5, excavation to a depth of one-foot would yield 65,000 in-place cubic yards (CY) of waste soil.

Existing OU5 Buildings

Although not a waste, the number of <u>buildings</u> that are candidates for response actions is a relevant quantity for development of remedial alternatives.

Reduction in cancer risk estimates for current or hypothetical future building occupants may be achieved through decontamination procedures previously employed in OU5 and elsewhere at the Site. Of the 8 occupied and 11 unoccupied buildings on OU5 (as of June 2010), 17 have estimated reasonable maximum exposure (RME) cancer risks above 1E-6 (above negligible levels). In some instances, risk estimates are limited by sample-specific analytical sensitivity (high detection limits).

Comment [BK31]: However, the site-specific risk assessment is still pending. Please note this in the text and assure the reader that the chosen remedial action will be re-evaluated post-ROD.

Comment [LC32]: DEQ would like to see a little more concrete reason for 12" specific to OU5. Maybe refer back to section 2.4.4.3 which indicates that asbestos contamination does not appear to increase at depth.

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Therefore, further investigation to better define the concentration term or exposure assumptions used in risk estimation may be appropriate prior to formulating a final list of buildings that would be candidates for interior decontamination.

#### 6.3. SCREENING OF ALTERNATIVES

### 6.3.1. Alternative 1 – No Further Action

The No-Action Alternative leaves OU5 in its current condition. However, certain Site-wide programs established to address proposed excavations or the discovery of vermiculite will remain in force at OU5 as well as the rest of the Site. Current programs of this nature include:

- U-Dig A program by which EPA would be notified if a request for utility location services are made.
- ERS Hotline Beginning in October 2006, EPA implemented the ERS program for the
  entire Site, including OU5. This program was set up to assist with unplanned and urgent
  exposures to <u>materials suspected or confirmed to contain LA fibers (e.g., attic insulation)</u>.
  The ERS program provides a full-time service where property owners, firemen, and other
  affected personnel or citizens can obtain access to LA expertise outside the normal course
  of scheduled <u>removal</u> actions. The ERS program currently responds to reports of residual
  vermiculite in OU5 buildings.

Effectiveness: Cancer risk estimates are within EPA's acceptable range under current land uses and building occupancy. However, changes in land use and building occupancy (e.g. increase in duration of daily occupancy, change in indoor activities, etc.) may result in health risks above a level of concern. The No Further Action alternative has no provisions for addressing changes in land use or building occupancy or for controlling the disposition of contaminated soils or building materials that may be generated during future development. As a result, the No-Further Action alternative ranks low in effectiveness.

<u>Implementability:</u> Implementation of this alternative requires no action and so implementability is ranked high.

Cost: No costs are associated with this alternative. Therefore, this alternative ranks low in cost.

#### 6.3.2. Alternative 2 – Institutional Controls

Under this alternative, institutional controls (ICs) would be implemented to <u>maintain</u> the current level of protectiveness at OU5. Controls such as restrictive covenants, zoning ordinances, easements, deed <u>notices and/or</u> restrictions, and public information serve to <u>manage land uses to acceptable activities or guide behavior to avoid exposures that may exceed health-based levels. Additionally, ICs provide <u>notice of land use</u> restrictions <u>upon</u> ownership <u>transfer</u>.</u>

Comment [LC331:

But everywhere else it the text, EPA states "within acceptable ranges" – so do the buildings need attention or not??

**Comment [BK34]:** If there is uncertainty a specific need for further investigation should be described.

**Comment [LC35]:** No Further Action still requires 5 year reviews. Please include a mention of these and the estimated costs associated the administration and preparation of the 5 year reviews.

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Comment [LC36]: Even with No Further Action alternatives, there is a cost of administration and 5 year reviews. While insignificant, some cost here and then the same admin/5 year review costs acknowledged in the other alternatives would be thorough and accurate.

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**Deleted:** for the proper transfer of ownership so

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Institutional controls under this alternative would be specific to OU5 in addition to the Site wide programs discussed under Alternative No. 1. It is possible that future Site-wide programs similar to ERS will be developed and implemented.

The OU-specific ICs would likely include management of:

- Changes in land use.
- Earthwork.
- Changes in building occupancy.
- Building modifications.
- Contaminated materials removed from OU5.

The division of responsibility for implementation of the ICs would be defined in a work plan prepared under the design phase of the remedy should Alternative 2 be selected. Lincoln County does not <u>currently</u> regulate land zoning/uses nor does it <u>currently</u> issue building permits.

Therefore, the County currently does not have a mechanism in-place for implementing ICs.

Oversight of IC implementation, monitoring, and enforcement may include EPA, State of

Montana and the City and County Health Board.

Operation and maintenance (O&M) would include periodic reviews (by EPA) of IC <u>sufficiency</u> compliance and reporting as well as responding to notifications of proposed changes in land use, building modifications or changes in building occupancy. In addition, statutory Five-Year reviews would be required.

Effectiveness: Institutional controls would minimize the likelihood of human health risks above a level of concern associated with changes in land use or building occupancy. Institutional controls would also minimize the likelihood that materials impacted by LA, such as OU5 soils, could be removed from OU5 in an uncontrolled manner. Lastly, the ICs could allow EPA to require that construction, demolition or remodeling activities are performed by qualified contractors and/or with regulatory agency oversight. Therefore, this alternative ranks high in effectiveness.

<u>Implementability</u>: Establishing <u>ICs</u> have a high level of implementability. However, compliance with <u>management practices and/or</u> restrictions requires landowner cooperation as well as some degree of regulatory agency oversight. Therefore, implementability of this alternative is considered to be moderate.

<u>Cost:</u> The capital costs for ICs consist of legal fees to establish and record deed restrictions.

Operation and maintenance costs would include statutory Five-Year reviews and may include other reviews of IC <u>performance</u> at a greater frequency. Periodic costs would include responding to notifications of proposed changes in land use, construction/remodeling activities and generation of <u>contaminated materials</u> proposed for disposal off of OU5.

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**Comment [LC37]:** Same comment and text change suggestions as in the Executive Summary

Deleted: Therefore, the County does not have a mechanism for implementing the ICs. The most likely mechanism for implementation would be a property deed restriction. Oversight of IC implementation may include EPA, State of Montana and the City and County Health Board.¶

**Comment [LC38]:** Same comment as in the Executive Summary.

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Comment [BK39]: Such actions would trigger the Montana Asbestos Control Act. See §75-2-501, MCA et seq. Thus, a review of ARARs is still necessary.

Deleted: deed restrictions

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Comment [LC40]: DEQ is not comfortable with limiting ICs to deed restrictions right now.

Although, we would like to see a further discussion of some specifics, but only identifying a single IC is not appropriate unless justification is also provided as to why others have been ruled out. Is this FFS providing a FULL evaluation of all the IC's under this alternative?

**Comment [BK41]:** Deed notices, plat restrictions or notices, restrictive covenants, easements, or development permits could also be effective ICs.

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Although this alternative has a higher cost than Alternative No. 1, it is still ranked low in cost. This is due to the relative cost of Alternative Nos. 1 and 2 as compared with Alternative Nos. 3 and 4.

#### 6.3.3. Alternative 3 – Soil Barrier with Institutional Controls

This alternative involves construction of a soil barrier across all of OU5. The soil barrier, if maintained, would prevent human exposure to LA impacted soils. As discussed above, variability in the occurrence of LA in OU5 soils based on ABS data is low (all risk estimates within EPA's acceptable range of 1E-4 to 1E-6). Therefore, this alternative would be implemented on the entirety of OU5 rather than target subareas.

Soil barriers of this type were described in the OU1 FS (CDM, 2009b) using a combination of 6-inches of subsoils and 6-inches of topsoil. Excavation of the top 12-inches of native soil in developed areas of OU5 is assumed prior to placement of backfill. Excavation prior to backfill is necessary in developed areas to retain access to buildings and ensure proper drainage. Excavation in undeveloped areas of OU5 is not necessary as proper drainage may be maintained with fill and topsoil. This general design is adopted for purposes of the OU5 FFS. However, variations on this design may be appropriate for portions of OU5. Actual cover thickness and materials used would be determined during remedial design.

The cover would be seeded to minimize erosion. A visible marker layer would be placed at the bottom of the cover to denote the extent of cleanup.

A disposal location(s) on OU5 would be established for soil excavated from developed areas of OU5. Clean fill and topsoil would be obtained from offsite sources outside the Libby Valley (used for the ongoing Libby removal efforts).

Institutional controls will include those described under Alternative No. 2 except for restrictions on changes in land use as these would <u>not</u> be necessary. Additional ICs would be developed to require barrier reconstruction when disturbed. Operation and maintenance would include regular inspection, repair and reporting on the soil barrier. In addition, statutory Five-Year reviews would be required.

<u>Effectiveness:</u> Placement of a barrier between LA impacted soils and the land surface would eliminate human exposure to LA in OU5 soils. However, residual cancer risks <u>within EPA's acceptable range</u> associated with exposure to LA in buildings (RME risks currently estimated between 8E-5 and 1E-7) would remain.

Institutional controls would minimize the likelihood that the soil barrier would be breached or that risks to building occupants would exceed current estimates. The soil barrier in combination with ICs would allow for changes in land use, including residential use.

**Comment [LC42]:** Does this word have significance here? If yes, what is it?

Comment [LC43]: How would this change? Isn't there a minimum requirement to ensure protection of human health?

**Comment [LC44]:** Is this also known as a repository? So the excavated soils would not go to the mine?

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**Comment [LC45]:** This statement is not clear as to how EPA reached this conclusion. Please provide more support as to why this is true.

**Comment [BK46]:** Some restrictions may be necessary to prevent breach of the barrier.

Deleted: no

**Comment [LC47]:** What about foundations or excavations that breech the barrier and result in contamination being exposed or brought to surface?

Comment [LC48]: But the IC's would still need to manage any deep excavations and soil management if disposal and replacement was

**Comment [BK49]:** ICs would have to address potential modification or demolition of existing buildings.

Overall, this alternative would eliminate human health risks from exposure to LA in soils. However, risk estimates based on current land use and levels of LA in soils are within EPAs acceptable risk range (1E-4 to 1E-6). In addition, risks above a negligible level (>1E-6) from exposure to LA in certain buildings would remain. As a result, this alternative is ranked moderate in effectiveness.

<u>Implementability:</u> This alternative would require large quantities of fill (>0.7MCY) to be imported to OU5, which may not be available locally. Community resistance may exist associated with the potential for dust generation at OU5, heavy truck traffic through Libby (and associated risk of traffic accidents) and interruption of business operations at OU5. Therefore, this alternative ranks moderate in implementability.

<u>Cost:</u> Detailed costing is not a part of the remedial alternative screening process. It is performed as part of the detailed analysis of those alternatives that are retained after the screening process. However, in order to provide a relative scale of the capital costs for alternatives considered in this screening process, preliminary costing of the earthwork portion of this alternative was performed.

Based on actual unit costs for <u>contaminated</u> soil excavation and importation/placement of subsoil and topsoil derived from similar work performed elsewhere in the Site, the estimated capital costs for the earthwork portion of this alternative is \$60M. Therefore, this alternative ranks high in cost. A preliminary cost estimate is provided as Appendix A1.

## 6.3.4. Alternative 4 - Decontamination of Existing Buildings

This alternative would be implemented in combination with Alternative 3 to prevent track-in of LA fibers originating in OU5 surface soils after building decontamination.

Under this alternative, existing buildings with estimated residual RME cancer risks above 1E-6 (based on default exposure assumptions) would be decontaminated to lower residual cancer risks below 1E-6. Building interior surfaces, floor coverings, etc., would be cleaned following the general procedures previously used in OU5 buildings such as the Central Maintenance Building. Destructive exploratory investigation of sealed cavities (e.g. walls) would not be part of this alternative.

Verification that remedial action had achieved the target cancer risk level of 1E-6 would be based on ABS sampling results and the application of default exposure assumptions when estimating post-remedial residual risks.

<u>Effectiveness:</u> This alternative (if implemented in combination with Alternative 3 to minimize track-in of LA fibers) would result in a further lowering of human health risks from LA remaining in existing buildings. However, RME risk estimates based on current building

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conditions are within EPAs acceptable risk range. As a result, this alternative is ranked moderate in effectiveness.

Implementability: It may not be possible to reliably achieve residual cancer risk estimates below 1E-6 over the long term. This is particularly true if vermiculite insulation remains in wall cavities. Destructive exploratory investigation of sealed cavities (e.g. walls) would not be part of this alternative. This type of response action is excluded as detecting and removing such trace (or larger) amounts in sealed cavities may not be possible without damaging the building beyond practicable limits while still preserving the original structure. Therefore, it is not clear whether this alternative is implementable and so it ranks moderate in implementability.

<u>Cost</u>: Given that this alternative would be implemented in combination with Alternative 3, the cost for the overall remedy would exceed the \$60M estimate for Alternative 3 earthwork alone. Therefore, the cost of this alternative is considered to be high.

#### 6.4. RESULTS OF ALTERNATIVE SCREENING

Based on the screening process, several alternatives were rejected and will not be advanced to the detailed and comparative analysis stage of the FFS. Table 6-1 summarizes the screening of alternatives and identifies those that were retained or rejected.

#### Retained Alternatives:

- Alternative 1 No Further Action Retained as base-line
- Alternative 2 Institutional Controls Retained because it is protective of human health, implementable, and cost effective.

#### Rejected Alternatives:

- Alternative 3 Soil Barrier with ICs Incremental reduction in cancer risk estimates is outweighed by the high cost and moderate level of implementability.
- Alternative 4 Decontamination of Existing Buildings Incremental reduction in cancer risk estimates is outweighed by the high cost and moderate level of implementability.

Retained Alternatives 1 and 2 are further developed in Section 7 and evaluated against the nine criteria specified in the NCP, including:

- Overall protection of human health and the environment
- Compliance with ARARs
- Long-term effectiveness and permanence
- Reduction in toxicity, mobility, and volume through treatment
- Short-term effectiveness
- Implementability

Comment [LC50]: Simple, interior decontamination of the buildings is implementable it's just the response is "limited" – so I'd say high implementability – effectiveness is what is in question if you want to use the logic in the first two sentences.

- Cost
- State acceptance
- Community acceptance

#### 7. DETAILED ANALYSIS OF ALTERNATIVES

#### 7.1. INTRODUCTION

The detailed analysis is conducted on the limited number of alternatives that represent viable approaches to remedial action after the screening stage. This analysis consists of an assessment of individual alternatives against each of nine evaluation criteria.

#### 7.2. **EVALUATION CRITERIA**

The nine NCP criteria are described below.

#### NCP Criteria

1. Overall protection of human health and the environment Alternatives shall be assessed to determine whether they can adequately protect human health and the environment, in both the short- and long-term, from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the site by eliminating, reducing, or controlling human exposures.

#### 2. Compliance with ARARs

The alternatives shall be assessed to determine whether they attain applicable or relevant and appropriate requirements under federal environmental laws and state environmental or facility siting laws or provide grounds for invoking waivers.

Since the alternatives retained after the screening do not involve disturbance of structures or terrain, there are no location or action specific-ARARs. In addition, numeric criteria do not exist for LA (or any asbestos) fibers in soil. However, numeric criteria exist for asbestos in air and water. As discussed in Section 5.0, water bodies on OU5 are storm water basins, fire suppression water storage or waste water lagoons (unclassified waters of the State) and therefore, numeric criteria for asbestos in water are not ARAR. Numeric criteria for asbestos in air are chemical-specific ARARs for OU5. Therefore, the alternatives shall be assessed against the following potential ARARs:

### Potential Chemical-Specific ARARs:

- Occupational Exposure Occupation Safety and Health Administration (OSHA) Permissible Exposure Limits (PELs).
- Montana Asbestos Control Act

# Potential Location Specific ARARs:

DRAFT Focused Feasibility Study

Comment [BK51]: It is important to clarify what the acceptable exposure level is and what that level is based upon.

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None

### Potential Action Specific ARARs:

• None

#### 3. Long-term effectiveness and permanence

Alternatives shall be assessed for the long-term effectiveness and permanence they afford, along with the degree of certainty that the alternative will prove successful. Factors that shall be considered, where appropriate, include the following:

- Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities.
- Adequacy and reliability of controls, such as containment systems and ICs, necessary to manage treatment residuals and untreated waste.
- 4. Reduction of toxicity, mobility or volume through treatment Alternatives shall be assessed for the degree to which they employ recycling or treatment that reduces toxicity, mobility, or volume, including how treatment is used to address the principal threats posed by the site.

#### 5. Short-Term effectiveness

The short-term impacts of alternatives shall be assessed considering the following:

- Short-term risks that might be posed to the community during implementation of an alternative.
- Potential impacts on workers during remedial action and the effectiveness and reliability of protective measures.
- Potential environmental impacts of the remedial action and the effectiveness and reliability of mitigative measures during implementation; and
- Time until protection is achieved.

### 6. Implementability

The ease or difficulty of implementing the alternatives shall be assessed by considering the following types of factors as appropriate:

Technical feasibility, including technical difficulties and unknowns associated with
the construction and operation of a technology, the reliability of the technology, ease
of undertaking additional remedial actions, and the ability to monitor the
effectiveness of the remedy.

Comment [BK52]: There could be redevelopment of the site which will trigger compliance with other standards, requirements or criteria. Please allow additional time for legal counsel to review ARARs prior to finalizing thisdocument.

- Administrative feasibility, including activities needed to be coordinated with other
  offices and agencies and the ability and time required to obtain any necessary
  approval and permits from other agencies (for off-site actions).
- Availability of services and materials, including the availability of adequate off-site
  treatment, storage capacity, and disposal capacity and services; the availability of
  necessary equipment and specialists, and provisions to ensure any necessary
  additional resources; the availability of services and materials; and availability of
  prospective technologies.

### 7. Cost

Cost estimates developed at the detailed analysis of alternatives phase of the FFS should have an accuracy range of -30% to +50% (EPA, 2000). These cost estimates are used to compare alternatives and support remedy selection. Cost estimates at this stage are intended to provide a measure of total resources over time associated with any given alternative.

The types of costs assessed in this FFS include the following:

- Capital costs, including both direct and indirect costs;
- Annual operations and maintenance costs; and
- Net present value of capital and O&M costs.

EPA guidance (EPA, 2000) requires use of a 7% discount factor when calculating net present value of capital, O&M costs for all non-Federal Facilities. However, EPA also suggests using current discount rates published by the Office of Management and Budget (OMB) for Federal Facility Sites. The OMB recommends a discount rate of 2.7% for projects with durations exceeding 30-years (OMB, 2009). This lower discount rate (reflecting real interest rates on treasury notes and bonds) would result in a significantly higher present worth cost for alternatives with relatively higher, long-term operational costs. However, the Site is not a federal facility and so the 7% discount rate is used.

#### 8. State acceptance

Assessment of state concerns may not be completed until comments on the FFS are received but may be discussed to the extent possible in the proposed plan issued for public comment. The state concerns that shall be assessed include the following:

- The state's position and key concerns related to the preferred alternative and other alternatives.
- State comments on ARARs or the proposed use of waivers.

Comment [LC53]: Doesn't the state also have through the Proposed Plan to comment and offer acceptance or not? That is what is stated later in Section 7.3.1

Assurance from the State of Montana for remedy implementation and O&M cost share contribution.

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The fact that the site-wide human health risk assessment is not complete, and EPA is proceeding with a remedy that is based on risk estimates for exposure to chrysotile.

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The State supports acceptable cancer risk of one-in-ten thousand or less.

#### 9. Community acceptance

This assessment includes determining which components of the alternatives interested persons in the community, including local elected officials, support, have reservations about, or oppose. This assessment may not be completed until comments on the proposed plan are received.

#### 7.3. DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

#### 7.3.1. Alternative 1- No Further Action

### **Description**

The No Further Action Alternative takes no further action at OU5.

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#### **Analysis**

Overall Protection of Human Health and Environment - Cancer risk estimates are within EPA's acceptable range under current land uses and building occupancy. However, changes in land use and building occupancy (resulting in increase in duration of daily occupancy, change in indoor activities, etc.) may result in health risks above a level of concern. The No Further Action alternative has no provisions for addressing changes in land use or building occupancy or for controlling the disposition of contaminated soils or building materials that may be generated during future development.

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Compliance with ARARs - ARARs are discussed in Section 5.0. Since no further action would be taken under this alternative, action- and location-specific ARARs do not apply. The following

summarizes the chemical-specific ARARs for Alternative 1.

### Potential Chemical-Specific ARARs

• Occupational Exposure - measured levels of asbestos in indoor and outdoor air are below regulatory levels for occupational exposure.

DRAFT Focused Feasibility Study Operable Unit 5, Libby Asbestos NPL Site

### Potential Location Specific ARARs:

• None

#### Potential Action Specific ARARs:

None

Long-Term Effectiveness – Although current human health risks are within EPA's acceptable risk range, the No Further Action alternative has no provisions for addressing changes in land use or building occupancy or for controlling the disposition of contaminated soils or building materials that may be generated during future development.

*Reduction in Toxicity, Mobility, and Volume through Treatment* – No treatment is proposed under this alternative.

*Short-Term Effectiveness* - Short-term effectiveness would remain unchanged under this alternative.

Implementability - Implementation of the No-Action Alternative would require no effort.

*Cost* - There are no costs associated with the No-Action Alternative.

*State Acceptance* - State acceptance will be determined after the public comment period and proposed plan.

*Community Acceptance* - Community acceptance will be determined after the public comment period and proposed plan.

#### 7.3.2. Alternative 2- Institutional Controls

Under this alternative, ICs would be implemented to minimize the likelihood of any change in the current level of protectiveness at OU5. These would be specific to OU5 in addition to the Site-wide programs discussed in Section 6.3.1. Responsibility for implementation of the ICs would lie with EPA, the ERS Program or other regulatory authority. It is possible that future Site-wide programs similar to ERS will be developed and implemented. Therefore, such future programs may assume responsibility for elements of Alternative 2.

The division of responsibility for implementation of the ICs would be defined in a work plan prepared under the design phase of the remedy should Alternative 2 be selected. However, the likely responsibly party(ies) is identified in the following OU-specific ICs:

1. Management of changes in land use.

Comment [BK54]: Based on exposure to chrysotile

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**Comment [LC55]:** See comment above on costs of administration and 5 year reviews.

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This IC would require an assessment of human health risks for the intended land use if a change in land use is proposed. Mitigation of risks above a level of concern would be required prior to establishment of the new land use. The level of concern would be defined in a work plan prepared under the design phase of the remedy.

EPA and the ERS program (or future equivalent program) would be responsible for assessing risks under the proposed new land use and determining if mitigation is required. Site work to mitigate risks would be performed by EPA or under the ERS program (or equivalent). However, actual site work <u>performed under Libby NPL Site-wide programs</u> such as ERS is not considered to be an element of Alternative 2.

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### 2. Management of dirt-moving activities

This IC would require notification of the EPA or ERS program (or equivalent) in the event that visible vermiculite is present during any earthwork activity involving more than one cubic yard. The ERS Program (or equivalent) would then determine whether the soils in question pose a risk above a level of concern and require removal. Removal would be performed by the ERS Program (or equivalent). Actual site work performed under Libby NPL Site-wide programs such as ERS is not considered to be an element of Alternative 2.

Criteria used to determine the need for mitigation will be documented in a work plan prepared as part of the design phase of the remedy (these criteria will likely be consistent with removal action criteria established for the Libby NPL Site). EPA involvement may be requested by the ERS Program (or equivalent) on occasion.

### 3. Management of changes in building occupancy.

This IC would require notification of the EPA or ERS Program (or equivalent) in the event of a proposed change in existing building occupancy type. This would include a building becoming occupied if vacant at the time of the risk assessment (performed as part of the OU5 RI) or a building where the type of occupancy changes (e.g. conversion of a warehouse to an office).

EPA or the ERS Program (or equivalent) would assess human health risks associated with the proposed change in occupancy. Mitigation of risks above a level of concern would be performed by the ERS Program (or equivalent). Actual site work performed under Libby NPL Site-wide programs such as ERS is not considered to be an element of Alternative 2.

#### 4. Management of building modifications.

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**Comment [LC56]:** Is there a risk-based reason for this volume? If yes, please provide here.

Comment [LC57]: Based on what criteria?

**Comment [BK58]:** Such activities would trigger Air, potentially water, storm water, solid waste, and other potential ARARs.

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Comment [LC59]: But this is remedial action. Maybe this is where EPA should start talking about the future site-wide risk assessment and what that may mean here.

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**Comment [LC60]:** Again, based on what criteria?

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This IC would require notification of the ERS Program (or equivalent) if any building modifications are proposed such as:

- Partial or total demolition.
- Remodeling that involves intrusion into closed cavities such as walls or ceiling or removal of flooring.

Comment [LC61]: Meaning carpet? Is this FFS suggesting that carpet removal presents an unacceptable risk to human health?

Or are you meaning the complete floor/concrete pad that then exposes soil?

Maybe a few clarifying words would be helpful.

### 5. Management of contaminated materials removed from OU5.

This IC would regulate material that leaves OU5 including:

- Waste bark
- Building demolition and remodeling wastes

The regulatory authority responsible for overseeing materials that must be disposed of in a controlled waste facility will be identified in a work plan prepared as part of the design phase of the remedy should Alternative 2 be selected. However, actual waste disposal performed by the land owner or others is not considered to be an element of Alternative 2.

Lincoln County does not regulate land zoning/uses nor does it issue building permits. Therefore, the County currently does not have a mechanism in-place for implementing ICs. Oversight of IC implementation, monitoring, and enforcement may include EPA, State of Montana and the City and County Health Board. In addition to any potential regulations imposed by either the County or the City and County Health Board, another mechanism for implementation would be a notice placed on the property deed identifying the notification requirements listed above.

EPA will work closely with the Montana Department of Environmental Quality (MDEQ), the City of Libby, and the City and County Board of Health in the remedial design process to ensure that the <u>ICs</u> selected will be implementable and achieve the desired results.

Operation and maintenance (O&M) would include periodic reviews (by EPA) of IC compliance and reporting as well as responding to notification of proposed changes in land use and building modifications or change in occupancy. In addition, statutory Five-Year reviews would be required.

Overall Protection of Human Health and Environment - Institutional controls would minimize the likelihood of human health risks above a level of concern associated with changes in land use or building occupancy. They would also minimize the likelihood that materials impacted by LA, such as OU5 soils, could be removed from OU5 in an uncontrolled manner. Lastly, the ICs would allow EPA to require that construction, demolition or remodeling activities are performed by qualified contractors and/or with regulatory agency oversight.

Compliance with ARARs – ARARs are discussed in Section 5.0. The following summarizes the chemical-, action- and location-specific ARARs for Alternative 2.

Potential Chemical-Specific ARARs:

DRAFT Focused Feasibility Study Operable Unit 5, Libby Asbestos NPL Site Deleted: Controls on

Deleted: waste

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Comment [LC62]: I think it's too early to say this. There are ways for the County to create mechanisms if necessary - through the Board of Health

Deleted: Lincoln County does not regulate land zoning/uses nor does it issue building permits. Therefore, the County does not have a mechanism for IC implementation. The most likely mechanism for implementation would be a restriction placed on the property deed.

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Comment [LC63]: Why the City? This is out of city limits. Maybe this should be the County?

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Comment [LC64]: Please see comment in Executive Summary

- Occupational Exposure measured levels of asbestos in indoor and outdoor air are below regulatory levels for occupational exposure.
- Montana Asbestos Control Act

**Comment [BK65]:** This assumes no redevelopment or changes in land use which is unrealistic.

### Potential Location Specific ARARs:

None

#### Potential Action Specific ARARs:

None

Comment [BK66]: Same comment as above.

Long-Term Effectiveness – The level of human exposure to LA will remain unchanged in perpetuity unless there are changes in land use or building occupancy in which case risks may rise above EPA's acceptable risk range. Institutional controls would minimize the likelihood that such changes would occur without being properly addressed through the development of risk estimates for the new land/building use(s) and mitigating those risks that are above a level of concern. The ICs would also minimize the likelihood that potentially LA contaminated materials such as demolition debris would leave OU5 in an uncontrolled manner. It is expected that the ICs, coupled with regulatory agency oversight and Site-wide asbestos assessment and mitigation programs would ensure the reliability of this remedial alternative.

*Reduction in Toxicity, Mobility, and Volume through Treatment* – No treatment is proposed under this alternative.

Short-Term Effectiveness - Short-term effectiveness of this alternative is high as the community and workers would incur no additional risks under this alternative given it does not involve disturbance to terrain or structures. The time until protection is achieved is minimal since current risks are within EPA's acceptable risk range. Full protection would be achieved once the ICs are implemented. This would be expected to occur within 18 months of remedy selection.

*Implementability* – The elements of this alternative are technically feasible given no physical work is involved. Administrative feasibility is expected to be moderate with the responsible agency(ies) formally identified along with the division of responsibility during the design phase should this alternative be selected.

*Cost* – The 30-year net present value of implementing this alternative is \$236,000. Detailed costing is provided in Appendix A2.

*State Acceptance* - State acceptance will be determined after the public comment period for the proposed plan.

*Community Acceptance* - Community acceptance will be determined after the public comment period for the proposed plan.

## 8. COMPARATIVE ANALYSIS OF ALTERNATIVES

This section compares the alternatives to each other using nine NCP criteria as a measure. Table 8-1 presents the comparative analysis for the nine NCP criteria.

#### 8.1. OVERALL PROTECTION OF HUMAN HEALTH AND ENVIRONMENT

The two alternatives provide a range of protectiveness from No Further Action (Alternative 1) to Institutional Controls (Alternative 2). Although current conditions at OU5 are protective of human health, the No Further Action alternative offers no means to manage future changes in land use, building occupancy or the disposition of contaminated materials from OU5. Any of these changes could result in human health risks rising above a level of concern.

Alternative 2 includes provisions to <u>manage changes in land use</u>, etc., at OU5 into the future in order to maintain the current level of protectiveness. Therefore, Alternative 2 provides a higher level of overall protectiveness than Alternative 1.

#### 8.2. COMPLIANCE WITH ARARS

Both alternatives would comply with the single chemical-specific ARAR for OU5. There are no location- or action-specific ARARs.

### 8.3. SHORT-TERM EFFECTIVENESS

Neither alternative involves disturbance of terrain or structures. Therefore, little short-term impacts are expected. The time until protection is achieved under Alternative 2 is minimal since current risks are within EPA's acceptable risk range. Full protection would be achieved once the ICs are implemented. This would be expected to occur within 18 months of remedy selection.

## 8.4. LONG-TERM EFFECTIVENESS AND PERMANENCE

The level of human exposure to LA will remain unchanged in perpetuity unless there are changes in land use or building occupancy in which case risks may rise above EPA's acceptable risk range. Institutional controls under Alternative 2 would minimize the likelihood that such changes would occur without being properly addressed. However, these LCs would have to be maintained in near perpetuity.

Although the ICs required under Alternative 2 will require near perpetual enforcement, this alternative offers a higher level of long-term effectiveness and permanence than the No<u>Further</u> Action Alternative.

Comment [BK67]: Based on current chrysotile risk estimates

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**Comment [BK68]:** This gives no consideration to future redevelopment of land use changes.

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**Comment [BK69]:** Enforcement of ICs must ensure ARAR compliance.

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# 8.5. REDUCTION IN TOXICITY, MOBILITY OR VOLUME OF CONTAMINANT THROUGH TREATMENT

No treatment is proposed for any Alternative. Therefore, no reduction in toxicity, mobility, or volume of LA through treatment is expected.

#### 8.6. IMPLEMENTABILITY

All of the Alternatives are technically and administratively implementable.

### 8.7. COST

Alternative 1 has no costs associated with it. Alternative 2 has the cost of institutional controls. All costs are summarized in Table 8-1 and Appendix A2.

Comment [LC70]: Again, question about 5 year

### 8.8. STATE ACCEPTANCE

To be determined during the FFS comment period and proposed plan.

### 8.9. COMMUNITY ACCEPTANCE

To be determined during the FFS comment period and proposed plan.

Comment [LC71]: Are you providing a draft FFS for comment or is this the default that the entire administrative record is under review during the Proposed Plan review period? This makes it look like the FFS is going out for separate public comment.

### 9. REFERENCES

Amandus HE, Wheeler R. 1987. The Morbidity and Mortality of Vermiculite Miners and Millers Exposed to Tremolite-Actinolite: Part II. *Mortality. Am. J. Ind. Med.* 11:15-26.

CDM, 2007. Final Data Summary Report, Operable Unit 5 – Former Stimson Lumber Company, Libby Asbestos Site, Libby, MT, October 16, 2007.

CDM, 2009a. Former Export Plant Site Final Remedial Investigation Report, Operable Unit 1, Libby Asbestos Site, Libby, MT, August 3, 2009.

CDM, 2009b. Former Export Plant Site Final Feasibility Study Report, Operable Unit 1, Libby *Asbestos Site, Libby, M*, August 2009.

EPA. 2000. A Guide to Developing and Documenting Cost Estimates During the Feasibility Study, OSWER 9355.0-75, July 2000.

EPA. 2003. Libby Asbestos Site, Residential/Commercial Cleanup Action Level and Clearance Criteria Technical Memorandum. Draft Final. U.S. Environmental Protection Agency, Region 8. December 15, 2003.

EPA. 2008. Framework for Investigating Asbestos-Contaminated Sites. Report prepared by the Asbestos Committee of the Technical Review Workgroup of the Office of Solid Waste and Emergency Response, U.S. Environmental protection Agency. OSWER Directive #9200.0-68. http://epa.gov/superfund/health/contaminants/asbestos/pdfs/framework\_asbestos\_guidance.pdf

EPA, 2010a. Libby Asbestos, Region 8, US EPA. Website. Retrieved April 2010 from the World Wide Web: www.epa.gov/libby/, January 2010.

EPA, 2010b. Region 8, Fourth Five Year Review Report for Libby Groundwater Contamination Superfund Site; City of Libby, Lincoln County, Montana. March 2010.

HDR, 2010. Remedial Investigation Report, Operable Unit No. 5 - Stimpson Lumber, Libby Asbestos NPL Site .

IARC. 1977. Monographs on the Evaluation of Carcinogenic Risks to Man. Volume 14. International Agency for Research on Cancer. IARC Scientific Publications. Lyon, France.

Leake BE, Wooley AR, Arps CES, et al. 1997. Nomenclature of amphiboles: report of the subcommittee on amphiboles of the International Mineralogical Association, Commission on New Minerals and Mineral Names. Am Mineral 82: 1019-1037.

McDonald JC, McDonald AD, Armstrong B, Sebastien P. 1986. Cohort study of mortality of vermiculite miners exposed to tremolite. *Brit. J. Ind. Med.* 43:436-444.

Meeker GP, Bern AM, Brownfield IK, Lowers HA, Sutley SJ, Hoeffen TM, Vance JS. 2003. The Composition and Morphology of Amphiboles from the Rainy Creek Complex, Near Libby, Montana. *American Mineralogist* 88:1955-1969.

Western Regional Climate Center (WRCC). Accessed April 23, 2010. <a href="http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?mt5000">http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?mt5000</a>